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(54) MOTOR FOR RECORDING DISK DRIVING AND RECORDING DISK DRIVE THEREWITH

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a motor for recording disk driving and a recording disk drive by the motor capable of preventing negative pressure and the excessive floating of lubricating oil and being easily assembled, and having high reliability and durability.

SOLUTION: Upper and lower radial dynamic pressure bearings in which herring bone grooves are provided, are formed between the inner peripheral surface of a sleeve and the outer peripheral surface of an outer cylinder member. A thrust dynamic pressure generating groove in which a spiral groove for inducing pressure applied radially inward is provided during rotation, is formed between the underside of the upper wall of a rotor hub and the top end surface of the sleeve. A hydrostatic bearing is formed between the lower end surface of a shaft and the upper end surface of a seal member. A helical communicating hole for communicating a clearance formed between a thrust dynamic pressure bearing and the hydrostatic bearing, and an adhesive groove parallel with the communicating hole, are formed between the outer peripheral surface of the shaft and the outer peripheral surface of the outer cylinder member.



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CLAIMS

[Claim(s)]

[Claim 1]

It is the motor for a record disk drive equipped with Rota which has a shaft, the sleeve in which the through tube in which this shaft is inserted loosely free [rotation] was formed, the circular top plate with which this shaft was constituted in one at the revolving-shaft alignment, and the cylinder wall which hangs from this periphery of this top plate,

Adhesion immobilization of the cylinder-like outer case member is carried out at the peripheral face of said shaft,

A continuous minute gap is formed in the peripheral face list of the upper limit side of said sleeve, the base of the top plate of said Rota and the inner skin of said sleeve, and said outer case member between the end faces of the inside of said lock out member, said shaft, and said outer case member,

In said minute gap, it is held continuously, without a lubricating oil breaking off over the whole,

Radial dynamic pressure bearing in which the herringbone slot of the inner skin of said sleeve and the peripheral face of said outer case member it comes [herringbone] to connect [fields / one of] the spiral slot on the pair was established as a dynamic pressure generating slot is constituted at least,

Thrust dynamic pressure bearing in which the dynamic pressure generating slot which gives the pressure of the upper limit side of said sleeve and the base of a top plate which goes to the method of the inside of radial to said lubricating oil at the time of rotation of said Rota was established is constituted by either at least,

Moreover, between the inside of said lock out member, and the end face of said shaft, bearing which has the pressure balanced on the dynamic pressure and bearing which are generated in said radial dynamic pressure bearing and/or said thrust dynamic pressure bearing, and parenchyma is formed, and said Rota surfaces by co-operation with said thrust dynamic pressure bearing and this bearing,

Between the peripheral face of said shaft, and the inner skin of said outer case member, the free passage hole which opens for free passage said lubricating oil held in the minute gap formed between the end faces of the minute gap formed between the upper limit side of said sleeve and the base of the top plate of said Rota, the inside of said lock out member, said shaft, and said outer case member possible [circulation] is formed, And the motor for a record disk drive characterized by forming in either field of the peripheral face of said shaft, and the inner skin of said outer case member the adhesion slot which is concurrent with said free passage hole, and applying adhesives to this adhesion slot.

[Claim 2]

Said free passage hole and said adhesion slot are a motor for a record disk drive according to claim 1 characterized by being formed from a streak of spiral slot extended from the upper part edge of said shaft to a lower part edge.

[Claim 3]

While estranging to shaft orientations and carrying out pair formation, said radial dynamic pressure bearing Said herringbone slot formed in radial dynamic pressure bearing located in the side which approaches said thrust dynamic pressure bearing among radial dynamic pressure bearings of this pair To said lubricating oil, between the inside of said lock out member, and the end face of a shaft, connect [side / which is formed / dynamic pressure bearing] the slot which has the spiral configuration of an unsymmetrical configuration in shaft orientations at the time of rotation of said Rota so that the going pressure may be given, and it is formed.

Moreover, said herringbone slot formed in radial dynamic pressure bearing located in the side estranged from said thrust dynamic pressure bearing The motor for a record disk drive according to claim 1 or 2 characterized by what the slot which has the spiral configuration of an equivalent configuration substantially so that the fluid dynamic pressure of a pressure gradient which becomes symmetrical may be given is connected [shaft orientations] to said lubricating oil at the time of rotation of said Rota, and is formed.

[Claim 4]

The record disk driving gear equipped with housing, the motor for a record disk drive according to claim 1 or 2 fixed to the top panel [of this housing], and base side, respectively, the record disk which was fixed to the Rota periphery section of this motor for a record disk drive and which can write information, and the information access means for writing in or reading information to the necessary location of this record disk.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

This invention relates to the record disk driving gear equipped with the motor for a record disk drive and it equipped with the hydrodynamic bearing.

[0002]

[Description of the Prior Art]

In hard disk drive, a removable disk driving gear, etc., as bearing of the motor which drives a record disk, the hydrodynamic bearing which has dynamic pressure generated by the lubrication fluid held in the gap of a shaft and a sleeve is used at the time of motor rotation, and many things are proposed from the former at it.

[0003]

For example, a shaft is fitted in the inner skin of a cylinder-like bearing member, a ring-like thrust plate is fixed to the lower limit section periphery of a shaft, and the motor using the hydrodynamic bearing which blockades the lower limit section of a bearing member with the counter plate is known.

[0004]

This conventional motor forms thrust dynamic pressure bearing in the minute gap of the inferior surface of tongue of the bearing member which counters the upper limit side of a thrust plate, and this and shaft orientations, the lower limit side of a thrust plate and this, and the top face of the counter plate which counters shaft orientations, respectively while forming radial dynamic pressure bearing in the gap of the peripheral face of a shaft, and the inner skin of a bearing member.

[0005]

and in the minute gap which forms radial dynamic pressure bearing and thrust dynamic pressure bearing If it is held continuously, it gets down (such lubricating oil maintenance structure is described as "full philharmonic structure" below) and a motor rotates, without oil breaking off as a lubrication fluid In radial dynamic pressure bearing and thrust dynamic pressure bearing, dynamic pressure occurs by oil, and a bearing member and a counter plate support a shaft free [rotation] in non-contact (for example, patent reference 1 reference).

[0006]

While the hydrodynamic bearing of full philharmonic structure has the advantage that the structure of bearing is simplified and it is fit for low cost There is concern which originates in processing and the assembly error of a member called the shaft and bearing member which constitute a hydrodynamic bearing, and the dynamic pressure generating slot for carrying out induction of the dynamic pressure to a lubricating oil at the time of rotation, imbalance produces in the internal pressure of a lubricating oil, and generating of air bubbles and the problem of the so-called fault surfacing that Rota surfaces beyond a design value produce.

[0007]

In order to eliminate such concern, inner skin putting the bearing ring of a forward hexagonal prism configuration, or putting on the peripheral face of a shaft the bearing ring which prepared two or more contact sections which project in inner skin at a radial, forming the lubricating oil path of shaft orientations between the peripheral face of a shaft and the inner skin of a bearing ring, and aiming at balance of the internal pressure of a lubricating oil is known (for example, patent reference 2 reference).

[0008]

[Patent reference 1]

JP,2002-153015,A (4th tribute-6 tribute, Fig. 2)

[Patent reference 2]

JP,2000-295816,A (5th tribute -9 tribute, Fig. 6 [one to])

[0009]

[Problem(s) to be Solved by the Invention]

However, in the case of a cylinder-like member, the approach of carrying out cutting from a cutting tool is

common like a bearing ring, making the metal pipe member which consists of a raw material hold in the chucking section of a processing machine, and rotating this. Therefore, it is difficult to process the inner skin of a cylindrical member in the shape of a polygon, and in order to form the projection of a radial, it is necessary to process it by changing a cutting tool, and for this reason, a processing man day will increase and it will lead to the increase of cost.

[0010]

Moreover, there is also concern from which such an oil path is divided by the stress deformation at the time of assembly and invasion of adhesives, and circulation of expected oil is prevented.

[0011]

This invention is offering the record disk driving gear which could assemble easily and was equipped with the motor for [high] a record disk drive and this motor of dependability and endurance while small and thin-shape-izing are possible for that purpose in full philharmonic structure and it can prevent the negative pressure of a lubricating oil, and generating of fault surfacing in view of the above-mentioned technical problem.

[0012]

[Means for Solving the Problem]

The motor for a record disk drive of this invention is a motor equipped with Rota which has a shaft, the sleeve in which the through tube in which a shaft is inserted loosely free [rotation] was formed, the circular top plate with which this shaft was constituted in one at the revolving-shaft alignment, and the cylinder wall which hangs from this periphery of a top plate,

Adhesion immobilization of the cylinder-like outer case member is carried out at the peripheral face of a shaft, A continuous minute gap is formed in the peripheral face list of the upper limit side of a sleeve, the base of the top plate of Rota and the inner skin of a sleeve, and an outer case member between the end faces of the inside of a lock out member, a shaft, and an outer case member,

In the minute gap, it is held continuously, without a lubricating oil breaking off over the whole,

Radial dynamic pressure bearing in which the herringbone slot of the inner skin of a sleeve and the peripheral face of an outer case member it comes [herringbone] to connect [fields / one of] the spiral slot on the pair was established as a dynamic pressure generating slot is constituted at least,

Thrust dynamic pressure bearing in which the dynamic pressure generating slot which gives the pressure of the upper limit side of a sleeve and the base of a top plate which goes to the method of the inside of radial to a lubricating oil at the time of rotation of Rota was established is constituted by either at least,

Moreover, between the inside of a lock out member, and the end face of a shaft, bearing which has the pressure balanced on the dynamic pressure and bearing which are generated in radial dynamic pressure bearing and/or thrust dynamic pressure bearing, and parenchyma is formed, and Rota surfaces by co-operation with thrust dynamic pressure bearing and this bearing,

Between the peripheral face of a shaft, and the inner skin of an outer case member, the free passage hole which opens for free passage the lubricating oil held in the minute gap formed between the end faces of the minute gap formed between the upper limit side of a sleeve and the base of the top plate of Rota, the inside of a lock out member, a shaft, and an outer case member possible [circulation] is formed,

And the adhesion slot which is concurrent with a free passage hole is formed in either field of the peripheral face of a shaft, and the inner skin of an outer case member, and it is characterized by applying adhesives to an adhesion slot (claim 1).

[0013]

By the motor of above-mentioned claim 1, it is eased from the need of finishing the peripheral face of a shaft with high precision, by constituting radial dynamic pressure bearing from an outer case member of another object with a shaft. Therefore, the integral construction of a shaft and a rotor hub becomes possible, and the problem to which the conclusion with poor assembly, a shaft, and a rotor hub originates in lack of joint strength called a gap is solved.

[0014]

Moreover, by forming a free passage hole in the gap of the peripheral face of a shaft, and the inner skin of an outer case member, the internal pressure of a lubricating oil until it results [from the upper limit side of a sleeve] in a lower limit side is maintained at balance, and generating of air bubbles and fault surfacing of Rota are controlled.

[0015]

That is, although the simple and cheap structure as full philharmonic structure is maintained, desired stability and dependability can be acquired.

[0016]

In addition, adhesives prevent invading into a free passage hole by forming in either field of the peripheral face

of a shaft, and the inner skin of an outer case member the adhesion slot which is concurrent with a free passage hole, applying adhesives to this adhesion slot, and pasting up an outer case member on a shaft.
[0017]

The free passage hole and adhesion slot of the above-mentioned motor for a record disk drive are characterized by a streak of thing currently formed spirally from the upper part of a shaft to a lower part (claim 2).
[0018]

Radial dynamic pressure bearing of the above-mentioned motor for a record disk drive While estranging to shaft orientations and carrying out pair formation, the herringbone slot formed in radial dynamic pressure bearing located in the side which approaches thrust dynamic pressure bearing among radial dynamic pressure bearings of a pair To a lubricating oil, between the inside of a lock out member, and the end face of a shaft, connect [side / which is formed / bearing] the slot which has the spiral configuration of an unsymmetrical configuration in shaft orientations at the time of rotation of Rota so that the going pressure may be given, and it is formed. Moreover, the herringbone slot formed in radial dynamic pressure bearing located in the side estranged from thrust dynamic pressure bearing It is characterized by what the slot which has the spiral configuration of an equivalent configuration substantially so that the fluid dynamic pressure of a pressure gradient which becomes symmetrical may be given is connected [shaft orientations] to a lubricating oil at the time of rotation of Rota, and is formed (claim 3).
[0019]

It is characterized by to be equipped the record disk driving gear of this invention with housing, the motor for a record disk drive according to claim 1 or 2 fixed to the top-panel [of housing], and base side, respectively, the record disk which was fixed to the Rota periphery section of the motor for a record disk drive and which can write information, and the information access means for writing in or reading information to the necessary location of a record disk (claim 4).
[0020]

[Embodiment of the Invention]

Hereafter, the motor for a record disk drive concerning the operation gestalt of this invention is explained with reference to drawing 1 . This motor for a record disk drive is for carrying out the rotation drive of the record disks, such as a hard disk. In addition, although the vertical direction of each drawing is made into the "vertical direction" for convenience in explanation of this operation gestalt, the direction in an actual attachment condition is not limited.
[0021]

The motor for a record disk drive illustrated by drawing 1 constitutes a **** configuration, and has the base plate 2 which has a feed hole in the center section, and the sleeve 4 fitted in a feed hole. The lower limit section is blockaded by the seal member 8, it is loosely inserted in the inner skin so that Rota 6 may mind a sleeve 4 and a minute gap, and a sleeve 4 constitutes a hollow cylinder configuration and the upper limit side counters it through Rota 6 and a minute gap.
[0022]

Rota 6 consists of the rotor hub 10, a rotor hub 10, a shaft 12 prepared in one, and an outer case member 14 of the hollow cylinder configuration fixed to the periphery section of a shaft 12. A rotor hub 10 consists of approximate circle board-like upper wall section 10a and peripheral wall section 10b which hangs from the periphery section of upper wall section 10a.
[0023]

While the Rota magnet 16 is fixed by the adhesion means, the base plate 2 is arranged at the periphery section lower part of peripheral wall section 10b located in the periphery section of a rotor hub 10 so that a stator 18 may counter from the method side of the outside of radial of the Rota magnet 16.
[0024]

Moreover, the record disk 20 shown according to a two-dot chain line is arranged outside peripheral wall section 10b in the way section upper part. When a screw 22 concludes to the screw hole prepared in the top-face side of upper wall section 10a of a rotor hub 10, the record disk 20 is pressed by shaft orientations by the clasper 24, and is held fixed at peripheral wall section 10b of a rotor hub 10.
[0025]

In the above structures, all of the gap of the inferior surface of tongue of upper wall section 10a of a rotor hub 10 and the upper limit side of a sleeve 4, the gap of the inner skin of a sleeve 4 and the peripheral face of the outer case member 14, and the gap of the lower limit side of a shaft 12 and the outer case member 14 and the upper limit side of the seal member 8 are continuing. In the continuous gap, it is held without a lubricating oil breaking off and the bearing of full philharmonic structure is constituted.

[0026]

The inclined plane whose diameter an outer diameter reduces from an upper limit side to shaft orientations is established in the peripheral face upper part of a sleeve 4. The gap dimension specified in the radial gap of this and the inner skin upper part of upper wall section 10a of the rotor hub 10 which counters radial It is increasing gradually as it estranges in a shaft-orientations lower part (base-plate 2 side), namely, the peripheral face upper part of a sleeve 4 and the inner skin upper part of upper wall section 10a of a rotor hub 10 cooperate, and the taper seal section 34 is constituted.

[0027]

Only in this taper seal section 34, the surface tension of a lubricating oil and an outside atmospheric pressure balance, and, as for the lubricating oil held in each gap mentioned above, the interface of a lubricating oil and air is formed in the shape of a meniscus.

[0028]

Annular falls out in the shaft-orientations lower part (base-plate 2 side) of the taper seal section 34, and the stop member 35 is formed in it. The omission of the shaft orientations of Rota 6 to a sleeve 4 is prevented by escaping, fixing the stop member 35 to the lower part inner circumference section of peripheral wall section 10b of a rotor hub 10 by means, such as adhesion, and fitting loosely into a bore in the state of non-contact in a sleeve 4 from the inclined plane lower limit section (base-plate 2 side) of the periphery section of a sleeve 4.

[0029]

It escaped and the top face of the stop member 35 has countered through the gap of the shaft orientations which follow the peripheral face of a sleeve 4 at the taper seal section 34, and have a **** clearance dimension rather than the minimum clearance dimension of the radial gap of the taper seal section 34.

[0030]

By escaping, escaping with the top face of the stop member 35, and setting up as small as possible the gap dimension of the minute gap of the shaft orientations specified between the top face of the stop member 35, and the periphery section of the sleeve 4 which counters shaft orientations A difference with the rate of flow with the air in the radial gap specified in the rate of flow and the taper seal section 34 of air in the minute gap of these shaft orientations at the time of rotation of a motor becomes large. Effluent resistivity to the exterior of the steam produced when a lubricating oil evaporated is enlarged, and vapor pressure [/ near the interface of oil] is kept high, and it functions as a labyrinth seal so that evapotranspiration of the further lubricating oil may be prevented.

[0031]

Next, the configuration of bearing is explained.

[0032]

The up radial dynamic pressure bearing 26 and the lower radial dynamic pressure bearing 27 are estranged by shaft orientations, and are prepared in the radial gap of the inner skin of a sleeve 4, and the peripheral face of the outer case member 14. The up radial dynamic pressure bearing 26 and the lower radial dynamic pressure bearing 27 consist of inner skin of a sleeve 4, a peripheral face of the outer case member 14, and a lubricating oil currently held in the gap between both the members that counter radial.

[0033]

In the part which constitutes the up radial dynamic pressure bearing 26 of the inner skin of a sleeve 4, induction of the lubricating oil is carried out to an abbreviation center section from the shaft-orientations both ends of the up radial dynamic pressure bearing 26, and induction of the migration pressure which has an imbalanced configuration and by which a lubricating oil will go to the method of the inside of shaft orientations (lower radial dynamic pressure bearing 27 side) if it passes, ring bone slot 28a is formed and Rota 6 rotates is carried out to shaft orientations. That is, although induction is carried out to the center section of the up radial bearing section 26, a flow by the side of the method of the inside of shaft orientations is urged to it to a part for the imbalance, and a lubricating oil while a lubricating oil serves as a maximum pressure in a lower part a little and supports Rota 6 from the center of the up radial dynamic pressure bearing 26, since herringbone slot 28a forms the imbalanced configuration in shaft orientations.

[0034]

Moreover, if induction of the lubricating oil is carried out to an abbreviation center section from the shaft-orientations both ends of the lower radial dynamic pressure bearing 27, it has and passes through a balanced configuration in the part which constitutes the lower radial dynamic pressure bearing 27 of the inner skin of a sleeve 4, ring bone slot 28b is formed in it and Rota 6 rotates, a lubricating oil will serve as a maximum pressure in the abbreviation center section of the lower radial dynamic pressure bearing 27, and will support Rota 6.

[0035]

Moreover, the upper limit side of a sleeve 4 and the inferior surface of tongue of upper wall section 10a of a rotor hub 10 counter shaft orientations mutually through a minute gap, and the thrust dynamic pressure bearing 30 is formed in the gap.

[0036]

The thrust dynamic pressure bearing 30 consists of lubricating oils currently held in the upper limit side of a sleeve 4, the inferior surface of tongue of upper wall section 10a of a rotor hub 10, and the gap between both the members that counter shaft orientations, and the spiral slot 32 is formed in the upper limit side of a sleeve 4 so that induction of the lubricating oil may be carried out to the method of the inside of radial (side edge section side of a shaft 12) at the time of motor rotation.

[0037]

Moreover, the static pressure bearing 29 using the internal pressure of the lubricating oil raised by the spiral slot 32 of the thrust dynamic pressure bearing 30 is constituted by the part which counters the shaft orientations of the lower limit side of a shaft 12, and the upper limit side of the seal member 8 so that it may explain in full detail behind.

[0038]

Moreover, the annular thrust yoke 36 which consists of ferromagnetic material is formed in the location which counters the Rota magnet 16 and shaft orientations of a base plate 2. A thrust yoke 36 has controlled generating of fault surfacing to which Rota 6 surfaces beyond the need while it makes the axial bearing capacity of the shaft orientations which act in the direction which surfaces generated in the static pressure bearing 29 and the thrust dynamic pressure bearing 30 by making shaft orientations generate the magnetic-attraction force with the Rota magnet 16 balance and stabilizes support of the thrust direction of Rota 6.

[0039]

In addition, the herringbone slots 28a and 28b where a sleeve 4 constitutes the up radial dynamic pressure bearing 26 and the lower dynamic pressure bearing 27 as mentioned above, Since the spiral slot 32 which constitutes the thrust dynamic pressure bearing 30, and the inclined plane which constitutes the taper seal section 34 are formed, Although endurance is maintained, it is necessary to finish a member with high precision, and in the quality of the material, members, such as a copper alloy with which surface treatment was performed for stainless steel material or wear-resistant improvement, are desirable.

[0040]

Next, a principle is explained to the configuration list of this invention with reference to drawing 2. Although drawing 2 is the sectional view in the operation gestalt of drawing 1 expanding and showing the bearing part of a motor, it shows only the shaft 12 as a front view.

[0041]

As shown in drawing 2, a streak of spiral slot 37 (a wavy line shows a part) is formed in the peripheral face of a shaft 12 until it results [from the shaft-orientations upper limit section] in the shaft-orientations lower limit section. This spiral slot 37 is formed of cutting so that it may become the shape of the shape of a cross-section abbreviation rectangle, the shape of a triangle, and a semicircle.

[0042]

The shaft 12 and the outer case member 14 are being fixed by adhesives so that it may explain in full detail behind. If adhesion immobilization of the outer case member 14 is carried out, the spiral free passage hole 40 which continues between the minute gaps formed in the thrust dynamic pressure bearing 30 and the static pressure bearing 29 will be specified to the peripheral face of a shaft 12 until it reaches [from a shaft-orientations upper limit side] a shaft-orientations lower limit side between the spiral slot 37 established in the peripheral face of a shaft 12, and the inner skin of the outer case member 14.

[0043]

The internal pressure of the lubricating oil which the lubricating oil is held from the thrust dynamic pressure bearing 30 in the free passage hole 40 succeeding the lubricating oil held in the gap which results in the static pressure bearing 29, and is held in the free passage hole 40 is a pressure almost equivalent to the internal pressure of the lubricating oil in the thrust dynamic pressure bearing 30.

[0044]

Rota 6 this free passage hole 40 at the time of rotation by imbalanced herringbone slot 28a of the up radial dynamic pressure bearing 26 The lubricating oil which moved under the sleeve 4 when a lubricating oil flowed to a shaft-orientations lower part (lower part of a sleeve 4) continuously The free passage hole 40 is returned upwards from a shaft-orientations lower part, and it functions as a fixed circuit again stuffed into the direction lower part of an axis by the up radial dynamic pressure bearing 26.

[0045]

Thus, the pressure of the lubricating oil held to each field in a bearing gap will be balanced, and generating of

negative pressure and generating of fault surfacing of Rota 6 will be certainly prevented by imbalanced herringbone slot 28a because a lubricating oil makes it flow to a shaft-orientations lower part continuously in a bearing gap. moreover, even when the stress deformation at the time of a processing error or assembly arises, circulation of the lubricating oil to the fixed direction is secured, and since the tolerance to the fault resulting from processing or assembly is markedly alike and improves, the yield is improved.

[0046]

Moreover, a streak of adhesion slot 38 (a wavy line shows a part) which is concurrent with the spiral slot 37 is formed in the shaft-orientations lower part of the spiral slot 37 of the periphery section of a shaft 12 until it results [from the shaft-orientations upper limit section of the spiral slot 37] in the shaft-orientations lower limit section. This adhesion slot 38 is formed of cutting so that it may become the shape of the shape of a cross-section abbreviation rectangle, the shape of a triangle, and a semicircle like the spiral slot 37.

[0047]

After adhesives are applied to the adhesion slot 38 of the peripheral face of a shaft 12, from the lower limit side of the peripheral face of a shaft 12, the outer case member 14 is fitted in an upper limit side, and is fixed.

[0048]

Although adhesives are drawn through by the outer case member 14 at this time, even if slight variation has arisen in the spreading location of adhesives, coverage, etc. since it holds in the adhesion slot 38 for example, it does not move to the shaft-orientations upper part from the adhesion slot 38.

[0049]

Thereby, while being able to assemble a motor easily, an improvement of working efficiency and the improvement of the yield are achieved.

[0050]

Moreover, when adhesives invade or trespass upon the spiral slot 37, it can be avoided that the free passage hole 40 is buried with adhesives etc., the free passage hole 40 specified between the peripheral face of a shaft 12 and the outer case member 14 can make balance the pressure of the upper limit of the radial gap of the peripheral face of the outer case member 14, and the inner skin of a sleeve 4, and a lower limit, and a motor with high dependability and endurance can be offered.

[0051]

In addition, although the gestalt of the above-mentioned implementation prepares and explains the spiral slot 37 and the adhesion slot 38 to the peripheral face of a shaft 12, it is possible not only this but to prepare in the inner skin of the outer case member 14.

[0052]

Next, the internal configuration of the common record disk driving gear 40 is explained with reference to drawing 3.

[0053]

The record disk driving gear 40 consists of housing 42 which carried out the shape of a rectangle, the interior of housing 42 forms clean space with little dust, dust, etc. to the degree of pole, and the spindle motor 44 with which it was equipped with the disc-like disk plate 46 which records information is arranged in the interior.

[0054]

Moreover, inside housing 42, the head migration device 54 in which information is written to the disk plate 46 is arranged, and this head migration device 54 is constituted by the actuator section 48 which moves the head 52 which write the information on the disk plate 46, the arm 50 supporting this head 52, a head 52, and an arm 50 to the necessary location on the disk plate 46.

[0055]

As mentioned above, although the operation gestalt of the motor for a record disk drive concerning this invention and a record disk driving gear was explained, various deformation thru/or corrections is possible for this invention, without not being limited to this operation gestalt and deviating from the range of invention.

[0056]

For example, in the above-mentioned operation gestalt, although the shape of a quirk of the herringbone slots 28a and 28b which constitute the up radial dynamic pressure bearing 26 and the lower radial dynamic pressure bearing 27 described it to shaft orientations as imbalance and the configuration which balances, respectively, not only this but various deformation is possible for it.

[0057]

It is also possible to get it blocked, for example, for herringbone slot 28b of the lower radial dynamic pressure bearing 27 to also make imbalance herringbone slot 28a of the up radial dynamic pressure bearing 26 at imbalance. Thereby, the pressure of the field between the up radial dynamic pressure bearing 26 and the lower radial dynamic pressure bearing 27 is maintained at the positive pressure more than atmospheric pressure, and

generating of negative pressure is prevented. Moreover, at the time of Rota 6 rotation, while a flow is further promoted by imbalanced herringbone slot 28b of the lower radial dynamic pressure bearing 27 in the shaft-orientations lower part (lower part of a sleeve 4) of a lubricating oil, a flow which returns the free passage hole 40 upwards from a shaft-orientations lower part is also further promoted by it.

[0058]

Moreover, in the above-mentioned operation gestalt and drawing 1 , although the structure which laid one record disk for convenience is explained and illustrated, not only this but this invention is applicable also to the motor which laid the record disk of two or more sheets.

[0059]

[Effect of the Invention]

By the motor for a record disk drive of a publication, to claims 1 and 2 While small and thin-shape-izing are possible and being able to prevent generating of fault surfacing of negative pressure or Rota Since the adhesion slot is formed in either field of the peripheral face of a shaft, and an outer case member in parallel to the free passage hole, adhesives prevent trespassing upon the spiral slot which constitutes a free passage hole, assembling easily is possible and the motor which was excellent in endurance at the dependability list can be offered.

[0060]

By the motor for a record disk drive according to claim 3 By connecting [bearing / thrust dynamic pressure / side / to connect / bearing / which is located / radial dynamic pressure] the slot which has the spiral configuration of an unsymmetrical configuration for the herringbone slot formed in shaft orientations, and forming Continuously, a lubricating oil flows to a shaft-orientations lower part, the pressure of the lubricating oil held to each field in a bearing gap is balanced, and generating of negative pressure and generating of fault surfacing of Rota can be prevented certainly.

[0061]

In a record disk driving gear according to claim 4, after securing sufficient function, the miniaturization of a record disk driving gear and thin shape-ization are realizable.

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view showing the operation gestalt of this invention.

[Drawing 2] Only a shaft is a front view although it is the partial expanded sectional view showing the operation gestalt of this invention.

[Drawing 3] It is the sectional view showing the internal configuration of a disk driving gear typically.

[Description of Notations]

4 Sleeve
8 Seal Member
10 Rotor Hub
10a Upper wall section
10b Peripheral wall section
12 Shaft
14 Outer Case Member
26 Up Radial Dynamic Pressure Bearing
27 Lower Radial Dynamic Pressure Bearing
28a, 28b Herringbone slot
29 Static Pressure Bearing
30 Thrust Dynamic Pressure Bearing
32 Spiral Slot
34 Taper Seal Section
37 Spiral Slot
38 Adhesion Slot
40 Free Passage Hole

[Translation done.]

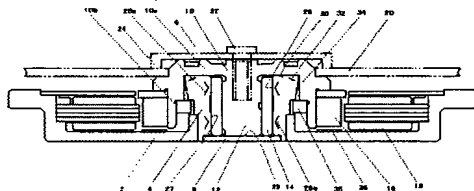
*** NOTICES ***

JP0 and NCIP1 are not responsible for any damages caused by the use of this translation.

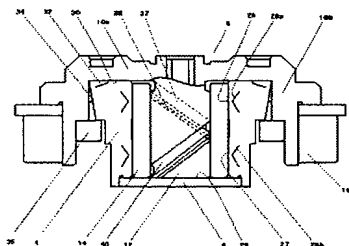
- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DRAWINGS

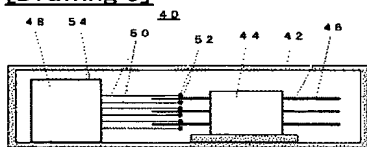
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]